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W03 - Teaching Earth's Rotation Through a Shadow Compass Learning Kit: An Inquiry-Based Astronomy Education Approach in Cebu, Philippines

Tuesday, 24 November 2026 13:00 (1 hour)

Understanding Earth's rotation and the Sun's apparent daily motion is fundamental to astronomy education, yet these concepts are often difficult for learners to visualize through textbook-based instruction alone. This study developed and evaluated a Shadow Compass Learning Kit, a low-cost instructional resource designed to support direct observation of changing shadow positions throughout the day. The kit consists of a compass-aligned baseboard with a vertical gnomon that enables systematic tracking of shadow orientation under natural sunlight. Field observations were conducted at Cebu Technological University – Main Campus, Cebu City, Philippines, with measurements recorded at two-hour intervals from morning to late afternoon. Shadow positions were documented through tracings, photographs, and observation logs to examine temporal changes in orientation. Results revealed a consistent progression of shadow positions corresponding to the changing position of the Sun in the sky. Shadows shifted from the northwest during the morning toward the east in the late afternoon, with the greatest directional change occurring around midday. Although minor variations in measured angles were observed, the overall pattern remained stable across observation periods, providing clear observational evidence of Earth's rotation. The findings demonstrate that the Shadow Compass Learning Kit can effectively transform an abstract astronomical concept into an observable phenomenon. Constructed from inexpensive and locally available materials, the kit offers a practical approach for supporting inquiry-based learning, promoting scientific literacy, and expanding access to astronomy education in diverse learning environments. The study highlights the potential of simple observational tools to strengthen astronomy communication and foster meaningful engagement with fundamental Earth–Sun relationships.

Keywords: astronomy education, Earth's rotation, solar motion, inquiry-based learning, shadow orientation, science communication

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